Economics and Sociology
Occasional Paper No. 1462

Bank Branches and Rural Deposits: Evidence from Bangladesh

by

Richard L. Meyer
M.A. Baqui Khalily
Leroy J. Hushak

May 20, 1988

Agricultural Finance Program
Department of Agricultural Economics
and Rural Sociology
The Ohio State University
2120 Fyffe Rd.
Columbus, Ohio 43210

Acknowledgements

An earlier version of this paper was presented at the Seminar on Rural Savings Mobilization held in Bangladesh, April 27-28, 1987, and published in The Bangladesh Development Studies as noted in the references.

We wish to acknowledge with appreciation several persons and institutions that helped make possible this research. MUCIA (Midwest Universities Consortium for International Activities) provided financial support for the M.S. degree program of M.A. Baqui Khalily through its World Bank project in Bangladesh. The USAID Mission in Dhaka through its Rural Finance Project provided much of the financial and logistical support in Bangladesh. The Bangladesh Bank, especially Kamal Uddin Ahmed and the Agricultural Credit Department, and the head offices of the participating banks assisted with providing access to the data. Zia Ahmed helped compile the data. The R. R. Nathan team was helpful in planning this research, and Nuimuddin Chowdhury generously shared his ideas and early research results that helped inspire our research design. Our colleagues Dale Adams and Carlos Cuevas also contributed useful ideas. The normal disclosures apply.

Bank Branches and Rural Deposits: Evidence from Bangladesh

By

Richard L. Meyer
M.A. Baqui Khalily
Leroy J. Hushak

Introduction

Three important reasons exist for the increased attention given to rural deposit mobilization in developing countries. First, countries must improve aggregate savings rates in order to substitute for reduced inflows of foreign savings. By definition, the rural sector looms large in these economies so it must furnish much of the savings, and some research shows that marginal propensities to save are higher in rural than in urban areas (e.g., Alamgir; Williamson). Secondly, strong arguments have been made recognizing the benefits that rural households obtain from secure places to hold financial assets (Adams; Vogel), and showing how the average rate of return to investment can rise through increased financial intermediation (Fry). Third, several arguments link the viability of rural financial institutions to increased deposit mobilization (Meyer).

A long list of factors are expected to influence deposits in rural financial institutions. Wai's framework of ability, willingness and opportunity to demand deposits has inspired much research. Opportunity is an important factor over which policy-makers have some control and deserves analysis for two reasons. First, research has shown that access to deposit services, measured by the density of deposit-taking institutions, is an important determinant of rural deposits (e.g., Srinivasan and Meyer, 1986). Policymakers have great influence over banking density through licensing and other regulations. Second, the policy emphasis on increased rural lending has prompted the expansion of lending facilities in rural areas. But some institutions, such as specialized agricultural development banks, are often denied the opportunity to use their branch network to accept deposits, while in other cases deposit taking has simply not been aggressively pursued because of funds easily available from the central bank and/or donors.

The rural deposit mobilization experience in Bangladesh is particularly interesting to evaluate. For several years the country employed policies to expand agricultural lending and, along with it, the bank branching network into rural areas. The impact on rural deposits has been significant because expanding the banking network can reduce transaction costs for depositors. Smaller size bank deposits become more attractive for households when transaction costs fall. On the other hand, full-service rural bank branches are expensive to operate even with the labor

intensive technology employed in Bangladesh. There are suggestions that the rapid expansion of rural branches has had a negative impact on the economics of bank operations (World Bank).

In addition to the deposit mobilization that occurs, the economics of rural banking requires the analysis of lending operations. Banks have responded to the country's desire to expand rural lending, and the distribution of branches can be expected to be influenced by the volume of loans made. By providing both loan and deposit services, branches may be able to capitalize on economies of scale and scope. Interestingly, when two nationalized commercial banks (NCBs) were privatized, they dropped out of special agricultural credit programs and transferred some of their rural branches to other banks. Perhaps they believed it was not profitable to operate rural branches solely for deposit mobilization purposes, especially when delinquency rates on agricultural loans are high.

The economics of rural branch operations are evaluated in a study by Srinivasan and Meyer (1988). The purpose of this paper is to document the deposit mobilization experience and to test the relationship between rural deposits and rural bank branches. Most research on rural deposits assumes that increased bank density stimulates households to deposit by reducing transaction costs to make and withdraw deposits. Little attention is paid to how deposits affect bank branching. This paper presents the results of a model to test the simultaneous relation between bank branching and deposits. An increase in branch density stimulates deposits while deposit potential also affects the number and location of bank branches.

The next section of this paper contains a brief review of the Bangladesh financial system and the policies that have influenced deposit mobilization, especially in rural areas. The third section reports the evolution of total and rural deposits. An econometric analysis of the determinants of rural deposits is presented in section four. The last section contains a discussion of the implications for rural deposit mobilization.

Financial Institutions and Policies

The Bangladesh financial system is still in the early stages of development. Following independence from Pakistan, all banks and insurance companies, excluding foreign companies, were nationalized on March 26, 1972, and six commercial banks and two insurance corporations were created. Foreign banks were allowed to operate under restricted conditions. At the beginning of 1981, Bangladesh had sixteen banks including seven foreign banks. During the 1983-84 period, eight private banks were licensed including two denationalized commercial banks. Most banks concentrate their operations in urban areas so rural deposit

mobilization is done mostly by the NCBs and the specialized agricultural development bank (Bangladesh Krishi Bank - BKB). Rural deposits in cooperatives and the postal savings systems are insignificant by comparison.

The nationalization of the banking system was undertaken for several economic and political reasons. Government control over the nationalized banks is pervasive, but regulation of the entire banking system is strong. This intervention affects bank performance and viability, particularly of rural branches. The Bangladesh Bank (central bank) regulates banking, and formulates policies under the strong guidance and direction of the Ministry of Finance. Three major policies--interest rate regulation, branch licensing and refinancing--directly affect rural deposit mobilization.

Interest rates on both deposits and loans are regulated and the deposit rate structure was revised significantly three times in 1974, 1976 and 1980 (Table 1). The range of rate increase was greatest in 1980 ranging between 2-1/2 and 5-3/4 percentage points. In the 1980s, interest rates on some classes of deposits in rural bank branches have been one or two percentage points higher than those in urban branches. Changes in deposit rate structure, however, have not kept pace with inflation. The real weighted interest rate paid on interest bearing deposits was negative every year from 1976 through 1984 with the exception of 1976, 1982 and 1983.

Rural branching policy appears to have been pursued largely with the objective of supplying cheap credit to farmers. However, historically two major factors were considered in granting licenses for banks to open new branches: deposit potential, as a function of income, and degree of competitiveness. This policy created insufficient demand for rural licenses so a "two-for-one" policy was introduced during the 1977-78 financial year whereby a bank was required to open two rural branches for each new urban branch authorized. During the period 1977-81, the number of rural bank branches almost doubled from 857 to 1,527. The expansion of rural branches slowed following the suspension of this policy in 1981. It is alleged that the decision to open rural branches during this expansion period was not always based on branch profitability (World Bank), but the new branches clearly had a positive influence on rural deposit mobilization.

The availability of cheap rediscount funds for agricultural loans may be an important disincentive for banks to mobilize deposits but there is little empirical research that actually tests for this negative causality (e.g., Meyer and Esguerra). The NCBs and especially BKB have been supplied with relatively abundant rediscount funds for their agricultural lending. Prior to September, 1983, refinancing facilities varied between 30 and

100 percent of the amount of targeted rural loans made by the bank and the interest rate charged was six percent, which was two percentage points below the bank rate[1] and half the 12 percent charged to borrowers. This policy was revised in September, 1983 at the urging of USAID to reduce bank dependency on refinancing and stimulate deposit mobilization.

The nature of the rural economy presents opportunities and challenges for developing cost-effective rural financial services. On the one hand, in a densely populated country like Bangladesh[2], there appears to be good potential for developing a dense banking network in rural areas that will bring bank branches fairly close to most rural residents. On the other hand, the market for deposit services is limited. Incomes are low (average per capita income in the country of about $150), most farm and nonfarm enterprises operate at a low volume, many transactions are not monetized, slow-moving rickshaws are the most important source of transportation so travel distances are usually short, and travel is particularly difficult in the wet season when much of the land is flooded. Therefore, transaction costs for many rural depositors with small accounts are likely to be high in spite of whatever internal efficiencies a branch can achieve.

The loan market is also constrained and the delinquency rate is high on agricultural loans. Many potential borrowers are not credit worthy. They have low and variable incomes, and have few reserves for times of adversity. Low-lying areas are subject to severe flooding which wipes out the few reserves held by farm households. Governmental relief and agricultural programs do not alleviate these conditions in any significant way for most households. In these relatively unfavorable circumstances, unless the banking system is provided with strong incentives, it is not likely to make many farm loans.

Patterns and Trends in Bank Deposits

The patterns and trends in total and rural bank deposits for the period 1975-84 are presented in this section. The deposit data used in Bangladesh are obtained from quarterly reports prepared by each bank branch and submitted directly to the Bangladesh Bank for computer processing. Some errors exist in the computer tapes and the reports produced from them. Some branches are late in submitting their reports so the tapes do not

---

[1]The bank rate is the normal rate at which banks can borrow from the Bangladesh Bank for liquidity purposes.

[2]100 million people in an area about the size of the state of Wisconsin.

include their entries. There are some quality control problems in data entry at both the branch and central bank. This results in missing branches and unverified and duplicate data records. These problems were corrected in the econometric analysis reported below, but they undoubtedly exist in the published data reported in this section. It is not expected, however, that these errors are significant enough to affect the overall conclusions. Bank deposits are defined as deposits in all banks except cooperative banks. Rural deposits are defined as those deposits held in bank branches defined as "rural" by the Bangladesh Bank; likewise urban deposits are defined as those held by "urban" branches operating in metropolitan and municipal areas.

Total bank deposits, expressed in nominal terms, experienced an average growth rate exceeding 24 percent for the 1975-84 period (Table 2). By 1984, deposits had increased seven times their 1975 level. By comparison, the annual average inflation rate was about 11 percent. Interest bearing deposits (special accounts, savings and term deposits) increased about ten times, while non-interest bearing deposits (current and call deposits) increased about five times indicating a considerable response to interest rate changes.

During this period, significant changes also took place in the proportion of personal deposits to total deposits. The share of personal deposits increased from 29 percent in 1975 to over 45 percent in 1984, while the share of other deposits (groups, organizations, government, businesses, etc.) declined. As shown below, rural deposits contributed to this growing share of personal deposits.

Historically most deposits were held by the NCBs because of their wide network and their predominance in the total banking sector. Their deposit share decreased significantly, however, from 90 percent to 71 percent during the 1973-84 period, partly due to increased bank privatization. Specialized banks increased their share to over 5 percent while the share for foreign and private banks rose to over 23 percent.

Changes in rural and urban bank deposits during the period 1976-84 are reported in Table 3. Total nominal rural deposits grew more than ten fold and the share of rural deposits increased from 9.2 to over 17 percent. The effects of the "two-for-one" branching policy can be seen by the relatively rapid expansion of rural branches. In 1976 less than one-half of the total branches were rural, but by 1984 about two-thirds were rural. Average deposits per rural branch almost tripled in this period.

To account for inflation, the deposit data were deflated.[3] Real rural deposits grew from 1.1 to 5.2 billion taka (1976=100) from 1976 to 1984. From 1976 to 1982 real deposits per branch ranged from a high of 1.34 million taka in 1977 to a low of 1.05 million in 1982, then rose to 1.58 million by 1984. Therefore, during much of this entire 1976-82 period the growth in real deposits kept pace with the growth in branches. Only in the years 1982-84 was there a steady increase in real deposits per branch. The pattern for urban deposits was somewhat similar. Total nominal deposits grew about six fold but only 2.5 times in real terms from 1976 to 1984. Average real deposits per urban branch fluctuated around 11.0 to 11.5 million taka from 1976 to 1982, then began a rapid rise reaching just over 15 million by 1984. Since the number of urban branches increased more slowly than rural branches, the increase in real deposits per urban branch was somewhat greater. This result may imply that urban residents already enjoyed fairly good access to banking in the mid-1970s so that branch expansion subsequently contributed somewhat less to urban deposit growth.

The other important feature to note is the relative size of rural and urban branches. The average amount of deposits per rural branch in 1984 was about 3.7 million taka (approximately $148,000).[4] Average urban deposits per branch, however, were almost 10 times this level. Small branch size can imply high costs for rural banking, the subject of a paper by Srinivasan and Meyer (1988).

The published data do not permit a detailed analysis of rural deposits. Therefore, the original branch level data compiled on the Bangladesh Bank data tapes were used to analyze the deposits of the four major NCBs (Agrani, Janata, Rupali, Sonali) and BKB. These institutions have most of the rural bank branches (84 percent in 1984) and mobilize most of the rural deposits (91 percent of 1984 deposits). These data are limited to the years 1983 and 1984, however, so they show the patterns of deposit growth in two years of rapid expansion as nominal rural deposits doubled during these two years.

The distribution of rural deposits held by these five major banks is reported in Table 4. Non-interest bearing deposits constituted about 20 percent of total rural deposits, a proportion similar to that found in urban branches. Seven out of eight interest-bearing deposit categories showed more rapid

---

[3]The consumer's price index published in the International Financial Statistics was used in the absence of a complete inflation series for rural areas.

[4]The exchange rate was roughly 25 taka = $1.00 in this period.

growth in this period, however. Furthermore, all categories of term deposits increased more rapidly than all other types of deposits. Total rural deposits increased by about 45 percent, while the increases in term deposits ranged between 57 to 133 percent. This change in deposit composition suggests that rural depositors treat a large portion of deposits as investments, and they are responsive to higher interest rates. An analysis of deposit growth by specific interest rate intervals showed that deposit categories that earned 12 percent or more experienced the most rapid growth.

Rural branches provide services to local businesses and governmental units, as well as households. The data in Table 5 provide an indication of clientele served according to the distribution of rural deposits by category of depositors. There are some doubts about the accuracy in reporting these specific categories but it appears that over 80 percent of the deposits originated from the private sector during these two years. Personal and service deposits constituted about three-fifths while public sector deposits constituted about 16 percent. It appears, therefore, that a significant amount of rural bank deposits come from households.

Unfortunately, the characteristics of personal depositors are unknown so the amounts actually deposited by farm households or by low income groups cannot be identified. Some inferences about deposits of low and middle income households can be obtained, however, by analyzing the size distribution of accounts. These rural branches had about 4 million accounts in 1983 and almost 5 million in 1984. About 95 percent of these accounts were less than 5,000 taka in size representing about half the total rural deposits (Table 6) implying that low and medium income households make significant use of these financial instruments. Furthermore, the growth rate in amount and number of small-sized accounts in the two years tended to be greater than many of the large size categories. There is no way to distinguish, however, the accounts related to farm versus nonfarm households.

The econometric analysis reported in the next section analyzed district level data. The distribution of rural deposits by district is reported in Table 7.[5] The magnitude and growth in deposits varied widely across districts. The three most commercially developed districts of Chittagong, Dhaka and Sylhet tended to expand deposits somewhat less rapidly than many less developed districts. This may imply that banking and moneti-zation of the economy expanded more quickly in the hinterland in

---

[5]District is an intermediate administrative unit between division and Upa-zilla.

this period than in regions already more developed. The developed regions presumably also started with a higher base.

Determinants of Deposit Behavior

In the previous section we documented the growth of rural bank branches and their deposits. This section reports the empirical results of a model designed to explain voluntary rural financial savings deposits in the five banks described above. A subset of district level interest-bearing deposits was obtained for the five banks from the Bangladesh Bank Data Tape. The model was specified to capture the behavior of the households that demand these deposits.

Previous studies of demand for rural deposits have used single equation models based on the implicit assumption of independence of supply of and demand for deposit services. This approach fails to recognize, however, that the number and distribution of deposit-taking institutions is influenced in part by deposit potential. Although the primary objective of banks during much of this period may have been to obtain urban branch licenses, the decision to seek a license for a rural branch in a particular location is determined by the possibility of tapping deposit potential, either because no branch exists in that market area or because the deposit potential is still great relative to the number of current branches. The competition among branches should expand aggregate deposits. Therefore, a simultaneous equation model was developed to explain district deposits and bank branches.

Since the introduction of the McKinnon and Shaw theoretical models, researchers have largely concentrated on two variables in the analysis of financial development: interest rates and banking facilities. Five major factors are found in the literature of deposit determination functions--income, interest rates, access to banking facilities, transaction costs and yields on competing non-financial investments. Some important but difficult to measure factors, such as quality of services provided to depositors, awareness of banking services and perceptions of the safety of deposits, have been largely ignored in empirical research.

Income is expected to have a positive effect on deposits. Because of the variability of rural income, the "permanent income" hypothesis may better explain the influence of income than does the "absolute income" hypothesis. Even though the empirical validity of the permanent income hypothesis for savings is well established (e.g., Canh; Friend and Taubman; Williamson), data limitations have forced deposit mobilization studies to utilize absolute income (e.g., Srinivasan and Meyer, 1986; Vasquez). The hypothesis is that depositors are sensitive to

changes in transitory income and use financial savings to even out consumption expenditures under variable income situations. Thus, the elasticity of deposits with respect to transitory income is expected to be higher than with respect to permanent income.

The most widely debated issue in rural finance is the relationship between interest rates and financial savings. McKinnon and Shaw argued that low nominal interest rates contribute to inefficient investment decisions and mobilization of household savings. Several studies following their views have established that low nominal interest rates coupled with high inflation rates discourage deposits while positive real interest rates stimulate deposits (e.g., Fry; Giovannini; Lanyi and Saracoglu; Srinivasan and Meyer, 1986; Vasquez). Wai argued that in LDCs, however, financial savings may not be responsive to interest rates because market rates are below equilibrium levels, depositors may be insensitive to small changes in interest rates, income effects outweigh substitution effects, and religious and social rules prohibit interest rates. Some studies have in fact demonstrated a weak relationship between interest rates and deposits (e.g., Iqbal; Tanchoco-Subida). On the other hand, Lanyi and Saracoglu, using empirical evidence from Asian and Latin American countries, suggested that the substitution effect of higher interest rates is more important than the income effect in developing countries so positive real interest rates should positively influence deposits.

Burkett and Vogel, and Ortmeyer underscored the significant role of transaction costs in portfolio decisions of households. The transaction costs of making and withdrawing deposits reduce the net returns received by depositors. Most of the literature, however, only considers the impact of borrower and lender transaction costs on credit rationing (Ahmed; Gonzalez-Vega; McKinnon; Shaw), and no study has been found that directly tests the effects of depositor transaction costs on deposits. Most studies rely on indirect estimates of transaction cost effects. Depositor transaction costs can be proxied by number of banking facilities, and availability of roads and vehicles. Several studies have found a positive and significant relationship between demand for deposits and expansion of bank branches (e.g., Burkett and Vogel; Rana; Srinivasan and Meyer, 1986; Vasquez; Wai).

Some analysts argue that demand for deposits is influenced by education which, among other effects, may increase the awareness of rural people about banking services (Mauri; Von Pischke) but literacy or awareness are among the least emphasized factors in rural deposit studies. The limited available empirical evidence is inconclusive; Vasquez found a negative elasticity of deposits with respect to education in the Dominican Republic while Koropecky found a positive relationship in

Bangladesh. But it is expected that as rural people become more knowledgeable about banking and banking services, either because of general education or the effect of having a nearby branch, they will develop confidence in banking institutions and their employees, and a sense of security in bank deposits leading to increased demand for deposits.

The factors that explain rural bank branching are less well understood. No study has been located which explicitly accounted for the impact of deposits on number and location of deposit-taking facilities in developing countries. Yet it should be expected that decisions to expand such facilities will depend on deposit potential, regional income, level of competition, and transportation and communications facilities available. The supply-leading approach to rural finance suggests that volume of rural loans contributes positively to the expansion of banking facilities (Patrick; Rana), but no study has been located that empirically tests this relationship. When strong incentives are given to expand rural loans, the actual or potential volume of rural credit may be an important factor affecting branching.

The limited empirical evidence available on bank branching suggests that level of competition and deposit potential in fact influence location of bank branches (Doyle et al.; Spong and Hoenig). In the Bangladesh case, the central bank appears to consider deposit potential and level of competition when evaluating requests for licenses to open new branches. Furthermore, it is expected that banks consider several factors influencing branch viability when requesting specific licenses, such as permanent income in a region, actual or potential volume of loans, inflation rates which influence the real level of deposits, the availability of transportation, and the volume of deposits generated by other banks.

Income, being an important determinant of deposits, is also expected to be a key variable explaining rural branch location. The higher the level of permanent income, the greater the deposit potential and the greater should be the network of rural banks. Doyle et al. used number of retail shops as an indicator of deposit potential. Since it appears that one of the policy objectives in Bangladesh was to expand rural branches as a way to expand rural lending, it is expected that the greater the volume of rural loans outstanding, the larger will be the branch network. It is expected that inflation will adversely affect bank expansion because of its expected negative impact on demand for deposits. On the other hand, improvements in rural transportation should encourage banks to expand their facilities in rural areas because of easier and faster travel, and possibly greater safety in handling money and providing banking services.

Empirical Model

Postulating a two-way causality between deposits and bank branches implies the need for a simultaneous equations model. The mathematical form selected was a power function based on a Cobb-Douglas production function. To account for differences in district size, a per capita specification of the variables was used. As in previous studies, linearity was imposed and the model was expressed mathematically in the log-log form as follows:

$$\ln(DINT/POP) = A + a_1 \ln PYP + a_2 \ln PYT + a_3 \ln BF + a_4 \ln RDV + a_5 \ln L + a_6 \ln P + U_1 \quad (1)$$

$$\ln BF = B + b_1 \ln PYP + b_2 \ln RDV + b_3 \ln P + b_4 \ln PCR + b_5 \ln(DINT/POP) + U_2 \quad (2)$$

where,

DINT/POP = District per capita interest bearing deposits;
PYP = District per capita permanent income;
PYT = District per capita transitory income;
BF = Number of district rural bank branches per capita;
RDV = District per capita index of roads and vehicles;
L = District literacy rate;
P = District rural inflation;
PCR = District per capita volume of rural loans outstanding;
U_1, U_2 = error terms

Equation (1) represents the demand for deposits function while equation (2) represents the supply of deposit services through expansion of bank branches. The conceptual discussion above which yields equations (1) and (2) excludes CR from equation (1) and L and PYT from equation (2) which satisfies the order conditions.

Two-stage least squares (2SLS) were used to estimate the parameters of the structural equations. The F-ratio was used to estimate the validity of the model and the conventional t-test was used to test the significance levels of the estimated parameters.

As discussed above, the relationship between deposits and number of bank branches is expected to be positive. Except for inflation, all other variables--permanent income, transitory income, literacy, and roads and vehicles--are likely to have positive signs in the deposit equation. Similarly, the number of bank branches is expected to be positively influenced by

deposits, roads and vehicles, permanent income and volume of loans outstanding. Inflation is expected to negatively affect bank branching.

The model was fitted to pooled data of twenty districts for 1983 and 1984. Data on deposits, number of bank branches, and volume of rural loans outstanding were obtained from the Bangladesh Bank Data Tape. Data on literacy rates, inflation rates, income, and roads and vehicles were obtained from the Statistical Year Book, 1985, and District Statistics, 1983.

Data on district agricultural GDP for the period 1976-84 were taken as a proxy for district rural income, and were used to estimate permanent and transitory income in a trend equation. Trend values were considered as permanent income, while the residuals were treated as transitory income. Literacy was used as a proxy for awareness of banking, and was defined as the percentage of persons 5 years of age or above who can read and/or write. Since nominal interest rates offered by banks are the same across districts, differences in real interest rates were captured through district inflation rates measured by changes in the cost of living index. Data on rural inflation were available only for six regions representing the four administrative divisions. Because of the small geographical size of divisions, these inflation data were used to represent all twenty districts.

The district roads and vehicles index was measured as:

$$RDV_j = \frac{RD_j \ / \ TA_j}{POP_j \ / \ TV_j} \times 100$$

where,

RDV_j = Weighted index of roads and vehicles in jth district;

RD_j = Mileage of roads in jth district;

TA_j = Total geographical area of jth district;

POP_j = Size of population in thousands of jth district.

TV_j = Total number of vehicles in jth district.

Districts with a large number of vehicles and mileage of roads per 1,000 people will have a high index. Vehicles were defined to include buses, cars and rickshaws.

Analysis of Empirical Results

The empirical results obtained in testing this model are presented in Tables 8 and 9. The second stage statistics report the direct effects of the explanatory variables on deposits (Table 8) and bank branches (Table 9). The reduced form coefficients show the total effects (direct and indirect) of the variables on deposits and bank branches. The coefficients in the double log equation can be interpreted as elasticities.

All structural coefficients for the deposit equation had the expected signs and, except for inflation rate and permanent income, were statistically significant. The model explains about 69 percent of the variance in interest bearing deposits. The bank branch equation explains about 80 percent of the variance. Except for roads and vehicles, all structural variables in the bank branch equation were statistically significant. Both equations were significant at the 0.0001 level.

The significant cross coefficients for the bank branch and interest bearing deposits variables in the structural equations support the hypothesis of two-way casualty between deposits and bank branches. The elasticity of interest bearing deposits with respect to bank branches estimated at 0.985 was significant at the 0.05 level, while the elasticity of bank branches with respect to interest bearing deposits estimated at 0.158 was significant at the 0.10 level.

Measures of both absolute and permanent income were tested. No statistically significant direct effect was found between deposits and permanent and absolute income, but both variables were significant in the reduced form deposit equation. Transitory income was significant in both deposit equations, and the magnitude of the coefficient was substantially larger than for the permanent income variable. These results imply that the permanent income hypothesis better explains the influence of income than does absolute income.

Both permanent income and inflation were not significant in the structural equation for deposits. But both were significant in the bank branch equations implying they influence the decision to expand banking facilities. High inflation rates reduce the real value of nominal deposits and discourage branch expansion. Because of the inter-relationship between permanent income, inflation, bank branch and deposits, it can be inferred that permanent income and inflation influence deposits indirectly through bank branches.

The roads and vehicles index had a direct effect on deposits, but not on expansion of bank branches. The reduced form coefficients for roads and vehicles were statistically significant in both the deposit and bank branch equations. This

implies that roads and vehicles influence bank branching indirectly through their effects on deposits.

Income, roads and vehicles, inflation, and literacy were all significant in the deposit equation. Zero-coefficients were assumed for the volume of outstanding rural loans in the deposit equation, and for the literacy and transitory income variables in the bank branch equation. The reduced form coefficients show the validity of these assumptions. The volume of rural loans outstanding had a positive effect on expansion of banking facilities, although the coefficient was relatively small. The coefficients for the other two variables were significant.

The elasticity of deposits with respect to the explanatory variables in relation to their level of significance suggest that transaction costs, proxied by expansion of bank branches and roads and vehicles, have an important impact on the demand for deposits. Transaction costs and transitory income are the two major factors explaining interest-bearing deposits. Expansion of bank branches is largely explained, apart from deposits, by permanent income and inflation.

Implications for Rural Deposit Mobilization

Bangladesh has made important strides in rural deposit mobilization. The share of rural deposits to total deposits increased from 9.2 to 17 percent from 1976 to 1984. Interest-bearing deposits represent about 80 percent of the total. About 95 percent of the rural deposit accounts in 1983 and 1984 representing one-half of total deposits were less than 5,000 taka ($200) in size suggesting that large numbers of low and medium income households are utilizing deposit services. Deposit growth in the rural hinterland was somewhat faster than in the more commercialized districts of the country in those two years.

An important factor explaining rural deposit expansion has been the rapid growth in rural branches, especially during the period when the "two-for-one" branching policy was in effect. From 1976 to 1984, the number of rural branches increased four-fold from 826 to 3301. Previous studies of deposit mobilization have stressed the positive impact of improved access to financial services which occurs when an expanded banking network reduces transaction costs for rural bank clients. Smaller size bank deposits become more attractive for households when the transaction costs of banking falls. This study, however, emphasizes the simultaneous relationship that exists between deposits and branches. An increase in branch density stimulates deposits while deposit potential is posited to affect the number and location of bank branches.

The econometric analysis of district deposits showed that the elasticity of interest bearing deposits with respect to bank branches was over 0.9 while the elasticity of bank branches with respect to deposits exceeded 0.15. Permanent and absolute levels of rural income were analyzed. The elasticity of deposits with respect to estimated transitory income approached 2.5 suggesting that deposits are used to even out the variability that occurs in ordinary income. Literacy and the roads and vehicles index also had a positive effect on deposits.

Permanent income and inflation were significant in the bank branch equation indicating they influence rural deposits indirectly through bank branches. The volume of rural loans outstanding also had a positive effect on branches although the coefficient was small.

These Bangladesh results confirm several expectations about rural deposit mobilization and suggest implications for other countries. Households respond to the net returns earned on their financial investments. Real interest rates represent the change in purchasing power that households gain from their deposits. These rates have often been negative in Bangladesh except for longer term fixed deposits. Over time, the mix of deposits has shifted towards higher interest rate categories.

Net returns to deposits are also influenced by the transaction costs borne by depositors. Apart from the internal operations of banks which determine how much time is spent and how much expense is encountered with opening an account and depositing and withdrawing funds, two external factors influence depositor transaction costs. The first is the density of the banking network. The rapid expansion of bank branches in Bangladesh has brought banking services geographically much closer to many rural households and has stimulated them to hold deposit accounts. With a given branch network, the second important factor is ease of transportation, represented in this study by the index of roads and vehicles.

The millions of small deposit accounts in rural bank branches in Bangladesh are evidence of the value that low income households place on deposit services. They show, furthermore, the ability that low income people have to save. This example, along with the recent deposit mobilization experiences in other low income countries, destroys the myth that the rural poor cannot save.

This research does not establish, however, that rural banking in Bangladesh is cost-effective. Through its branching and rural lending policies, Bangladesh has succeeded in expanded rural branches and, through them, rural loans. Banks have used the branch network to mobilize deposits, and the ratio of rural loans to deposits has steadily risen. It exceeded one for the

first time in 1983 and approached 1.4 in 1986. But loan recovery of rural loans is a serious problem and appears to have deteriorated. Therefore the viability of rural banking is in question. The fact that, upon privatization, two nationalized commercial banks dropped out of participation in government agricultural credit programs and transferred several rural branches to the remaining NCBs and BKB is indicative of the problem.

Bangladesh policymakers have succeeded in accomplishing the easy aspect of deposit mobilization, namely expanding the branch network. The remaining challenge is to make the system financially viable. Greater attention is required to assessing the losses the banking system must absorb by operating small branches and by making many loans that are not repaid versus the gains to borrowers and depositors through lower transaction costs and greater access to financial services.

Table 1

Interest Rate Structure of Rural Bank Deposits,
1971 to present

Type of Deposit	Dec 1971 to June 1974	July 1, 1974 to March 31, 1976	April 1, 1976 to April 30, 1977	May 1, 1977 to Oct. 15, 1980	Oct.16,1980 to Dec 1, 1982	Dec. 2, 1982 to Dec. 31, 1984	Jan. 1, 1985 to Present
Call deposits	none	none	none	none	4 1/2	none	none
Special account	3 - 3 1/4	4 - 4 1/4	5 - 5 1/4	4 - 4 1/4	4 1/2	4 1/2	4 1/2
Savings with checking	4.00	5.00	6.00	6.00[a/]	8 1/2	8 1/2[b/]	10 1/2
Savings without checking	4 1/2	6.00	7.00	7 3/4	10.00	10.00	11.00
Fixed deposits (term):							
1) 3 months and over, less than 6	4 1/2	6.00	7.00	8 1/2	12.00	12.00	12.00
2) 6 months and over, less than 1 year	4 3/4	6 1/2	7 1/2	9.00	13.00	13.00	13.00
3) 1 year and over, less than 2	5.00	7 1/4	8 1/4	9 1/4	14.00	14.00	14.00
4) 2 years and over, less than 3	5 1/2	8 1/4	9 1/4	9 1/4	14 1/2	14 1/2	14 1/2
5) For 3 years and over	6.00	9 1/4	10 1/4	10 1/4	15.00	15.00	15.00

a/ Reduced to 4 1/2 percent in effect from August 1, 1977.
b/ In the rural areas, the rate was 9 1/2 percent in effect from July 1, 1984

Source: Economic Trends, December, 1985, Bangladesh Bank.

TABLE 2

Total Bank Deposits
By Type of Deposit, 1975-84
Year Ending June 30

Year	TYPE										
	Current deposits	Call deposits	Special account deposits	SAVING DEPOSITS		TERM DEPOSITS (months)					TOTAL
				Checking	Non-checking	3-<6	6-<12	12-<24	24-<36	36+	
1975	3,082	60	2,295	1,964	331	532	439	544	100	834	10,182
1976	3,383	74	2,773	2,410	396	396	234	655	150	1,121	11,594
1977	3,920	103	3,554	2,882	486	520	272	781	232	1,701	14,453
1978	4,425	268	4,185	3,542	686	382	413	819	277	2,479	17,477
1979	5,808	410	5,452	4,461	1,078	315	701	955	367	3,384	22,932
1980	7,473	186	8,278	5,099	1,371	381	579	1,043	401	4,258	28,068
1981	7,616	289	9,024	6,796	2,093	897	927	1,486	551	5,577	35,236
1982	8,006	752	9,019	6,749	2,246	1,327	912	2,193	572	6,720	38,501
1983	10,808	1,029	11,024	8,475	2,805	2,339	1,468	3,893	780	8,557	50,980
1984	14,207	468	14,962	11,098	3,895	3,739	3,154	7,017	900	12,144	71,584
Average Growth Rate (Percent)	18.9	47.4	23.9	21.6	32.4	33.6	34.2	35.4	28.7	35.0	24.5

Source: Bangladesh Bank Bulletin, February, 1985.

Table 3
Total Bank Deposits
By Rural and Urban Branches, 1976-84
Year Ending June 30

Year	RURAL				URBAN			
	Number of Branches	Total Deposits	Average Deposits per Branch	Percent of Total Deposits	Number of Branches	Total Deposits	Average Deposits per Branch	Percent of Total Deposits
		(Million Taka)				(Million Taka)		
1976	826	1,063	1.28	9.2	922	10,531	11.42	90.8
1977	1,053	1,552	1.47	10.7	1,009	12,901	12.78	89.3
1978	1,634	2,316	1.42	13.3	1,125	15,161	13.48	86.7
1979	2,001	3,540	1.77	15.4	1,247	19,391	15.55	84.6
1980	2,437	5,041	2.07	17.3	1,342	24,027	17.90	82.7
1981	2,796	5,599	2.00	16.2	1,493	29,587	19.82	83.8
1982	2,932	5,938	2.03	15.4	1,538	32,563	21.17	84.6
1983	3,050	8,544	2.80	16.8	1,565	42,437	27.12	83.2
1984	3,301	12,215	3.70	17.1	1,684	59,369	35.25	82.9
Average Growth Rate (Percent)	19.8	36.7	15.1		7.9	24.4	15.4	

Source: Bangladesh Bank Bulletin, February, 1985.
Scheduled Bank Statistics, 1976-84, Bangladesh Bank.

TABLE 4

Rural Deposits of Five Banks
by Type of Deposit, 1983-84
Year Ending June 30

TYPE	1983 Deposit	1983 Percent	1984 Deposits	1984 Percent	Growth Rate Percent
			(Million Taka)		
Current Deposits	1,588	20.7	2,112	19.0	33.0
Call Deposits	67	0.9	70	0.6	4.9
Special Account Deposits	624	8.1	920	8.3	47.5
Savings (Checking) Deposits	2,671	34.8	3,715	33.4	39.1
Savings (Non-checking) Deposits	946	12.3	1,405	12.6	48.5
Fixed Deposits (term):					
3 - < 6 months	54	0.7	96	0.9	78.3
6 - < 12 months	67	0.9	156	1.4	132.8
12 - < 24 months	251	3.3	413	3.7	64.7
24 - < 36 months	75	1.0	122	1.1	61.9
36 + months	1,343	17.5	2,113	19.0	57.3
TOTAL	7,686	100	11,122	100	44.7

Source: Bangladesh Bank Data Tape

TABLE 5

Rural Deposits of Five Banks
by Category of Depositors, 1983-84
Year Ending June 30

Category	1983 Deposits	1983 Percent	1984 Deposit	1984 Percent	Growth Rate Percent
	(Million Taka)				
FOREIGN	**42**	**0.5**	**73**	**0.7**	**75.8**
PUBLIC SECTOR:	**1,390**	**16.8**	**1,745**	**15.6**	**25.5**
Government	219	2.8	347	3.1	58.8
Public enterprises	536	7.0	691	6.2	29.0
Autonomous, semi-auto and local authorities	417	5.4	537	4.8	28.9
Others	119	1.6	169	1.5	42.5
PRIVATE SECTOR	**6,354**	**82.7**	**9,304**	**83.6**	**46.4**
Agri, fishing, etc.	98	1.3	158	1.4	60.0
Personal and service	4,423	57.5	6,699	60.2	51.4
Manufacturing, business org. & others	574	7.5	735	6.6	28.1
Others	1,258	16.4	1,712	15.4	36.1
TOTAL[a]/	**7,686**	**100**	**11,122**	**99.9**	**44.7**

a/ Totals may not agree because of rounding.

Source: Bangladesh Bank Data Tape

TABLE 6
Size Distribution of Rural Deposit Accounts
of Five Banks, 1983-84
Year Ending June 30

Size of Account	1983 Deposits	1983 Percent	1983 Number of Accounts	1983 Percent	1984 Deposits	1984 Percent	1984 Number of Accounts	1984 Percent	Growth Rate Percent Deposits	Growth Rate Percent Number of Accounts
(Thousand)					(Million Taka)					
0 - < 5	3097	50.8	3,812,936	95.3	5,375	48.3	4,687,213	94.0	37.6	22.9
5 - < 10	720	9.4	102,556	2.6	1,093	9.8	156,811	3.2	51.8	52.9
10 - < 25	926	12.0	61,042	1.5	1,333	13.8	101,148	2.0	65.6	65.7
25 - < 50	545	7.1	16,042	0.4	875	7.9	25,877	0.5	60.6	61.3
50 - < 100	372	4.8	5,412	0.2	628	5.7	9,377	0.2	68.8	73.3
100 - < 200	310	4.0	2,317	0.1	675	6.1	2,992	0.1	118.0	29.1
200 - < 300	112	1.5	466	a/	152	1.4	635	a/	36.5	36.3
300 - < 400	69	0.9	204	a/	86	0.8	249	a/	25.2	22.1
400 - < 500	68	0.9	152	a/	53	0.5	118	a/	-21.4	-22.4
500 - <1000	138	1.8	212	a/	232	2.1	339	a/	69.2	59.9
1000 +	521	6.8	202	a/	684	6.2	268	a/	31.3	32.7
TOTAL	7686		4,001,504		11,122		4,985,027		44.7	24.6

a/ Less than 0.1 percent.

Source: Bangladesh Bank Data Tape

TABLE 7

Rural Deposits for Five Banks
by District, 1983-84
Year ending June 30

DISTRICT	Year 1983	Year 1984	Growth Rate Percent
	(Million Taka)		
Chittagong	1,091	1,449	32.8
Chittagong H.T.	124	184	47.7
Comilla	589	905	53.7
Noakhali	368	518	41.0
Sylhet	913	1,252	37.1
Dhaka	992	1,407	41.8
Faridpur	238	341	43.3
Mymensing	252	326	29.2
Tangail	194	275	41.5
Jamalpur	117	158	35.3
Barisal	251	381	51.8
Jessore	372	560	50.4
Khulna	290	532	83.3
Kushtia	214	308	44.0
Putuakhali	75	128	71.5
Bogra	248	359	44.6
Dinajpur	226	348	71.5
Pabna	307	443	44.6
Rajshahi	482	787	63.3
Rangpur	342	562	64.5
TOTAL a/	7,686	11,122	44.7

a/ Totals may not agree because of rounding.

Source: Bangladesh Bank Data Tape

TABLE 8
Estimated Parameters of the Double Log
Interest Bearing Deposit Function

	Permanent Income Hypothesis			Absolute Income Hypothesis	
Parameter (Variable)	Reduced Form Equation T-Ratio)	Second Stage Statistics (T-Ratio)	Indirect Effect a/	Reduced Form Equation (T-Ratio)	Second Stage Statistics (T-Ratio)
Intercept	-1.686***	6.06***		-2.243**	10.992**
	(-.932)	(.884)		(-1.328)	(1.428)
(PYP)	.595*	.057	.538		
	(3.571)	(.083)			
(PYT)	2.783**	2.40**	.383		
	(1.225)	(1.260)			
(L)	.216	.185***	.031	.286***	.169
	(.595)	(.849)		(.811)	(.758)
(P)	-.104	.058	-.162	.009	.287*
	(-.560)	(.230)		(.06[illegible])	(1.760)
(BF)		.985*			1.626**
		(1.785)			(1.586)
(RDV)	.278*	.219*	.059	.263	.167*
	(4.138)	(2.333)		(3.948)	(2.194)
(PCR)	.119			.194***	
	(.623)			(1.134)	
(PY)				.565*	-.341
				(3.386)	(-.590)
F-Ratio	7.1 b/	11.91 b/		8.15 b/	16.35 b/
R-Square		.684	---		.706

*Significant at .05 level.
**Significant at .10 level.
***Significant at .20 level.
a/ Indirect effects are estimated as the difference between the reduced form and the second stage coefficients.
b/ Significant at .0001 level

TABLE 9

Estimated Parameters of The Double Log
Bank Branch Function

Parameter (Variable)	Permanent Income Hypothesis: Reduced Form Equation (T-Ratio)	Permanent Income Hypothesis: Second Stage Statistics (T-Ratio)	Permanent Income Hypothesis: Indirect Effect[a]	Absolute Income Hypothesis: Reduced Form Equation (T-Ratio)	Absolute Income Hypothesis: Second Stage Statistics (T-Ratio)
Intercept	-8.166* (11.06)	-7.893* (-12.762)		-8.14* (-11.762)	-7.577* (-10.959)
(PYP)	.568* (8.351)	.478* (3.096)	.09		
(PYT)	.402 (.381)				
(PY)				.557* (8.145)	.415* (1.864)
(L)	.038 (.254)			.072 (.483)	
(P)	-.17* (-2.254)	-.155* (-3.591)	-.015	-.171* (-2.936)	-.173* (-4.208)
(RDV)	.063* (2.309)	.022 (.294)	.041	.059* (2.178)	-.007 (-.061)
(PCR)	.126* (1.617)	.107** (1.487)	.019	.119* (1.702)	.071*** (.864)
(DINT/PUP)		.158** (1.624)			.252** (1.679)
F-Ratio	12.94[b]	26.20[b]		14.74[b]	29.15[b]
R-Square		.794			.811

*Significant at .05 level.
**Significant at .10 level.
***Significant at .20 level.

[a] Indirect effects are estimated as the difference between the reduced form and the second stage coefficients.
[b] Significant at .0001 level

REFERENCES

Adams, Dale W "Mobilizing Household Savings through Financial Markets." Economic Development and Cultural Change. 26(1978):547-570.

Ahmed, Zia U. Transaction Costs in Rural Financial Markets in Bangladesh: A Study of a Rural Credit Market. Unpublished Ph.D. Dissertation. University of Virginia, 1982.

Alamgir, Mohiuddin. "Some Analysis of Distribution of Income, Consumption, Saving and Poverty in Bangladesh." The Bangladesh Development Studies. II(1974):737-818.

Bangladesh Bureau of Statistics. Statistical Year Book, Dhaka, 1985.

---------- District Statistics, Dhaka, 1983.

Burkett, P. and R. C. Vogel. "Microeconomic Foundations of Financial Liberalization: Interest Rates, Transactions Costs and Financial Savings." Economic Reform and Stabilization in Latin America, eds. Michael Connally and Claudio Gonzalez-Vega. New York: Praeger Publishers, 1986.

Canh, T. Quang. Income Instability and Consumption Behavior: A Study of Taiwanese Farm Households, 1964-70. Unpublished Ph.D. Dissertation. The Ohio State University, 1974.

Cuevas, Carlos E. Intermediation Costs and Scale Economies of Banking under Financial Regulation in Honduras. Unpublished Ph.D. Dissertation. The Ohio State University, 1984.

Doyle, P., I. Fenwick and G. P. Savage. "A Model of Evaluating Bank Location and Performance." Journal of Bank Research. Summer(1981):90-95.

Friend, I. and P. Taubman. "The Aggregate Propensity to Save: Some Concepts and their Application to International Data." Review of Economics and Statistics. 48(1966):113-123.

Fry, M. J. "Econometric Analysis of National Saving Rates." Domestic Resource Mobilization through Financial Development. Vol. II, Manila: Asian Development Bank, 1984.

Giovannini, A. "The Interest Elasticity of Savings in Developing Countries: The Existing Evidence." World Development. 11(1983):601-607.

Gonzalez-Vega, Claudio. On the Iron Law of Interest Rate Restrictions, Agricultural Credit Policies in Costa Rica and in Other Less Developed Countries. Unpublished Ph.D. Dissertation. Stanford University, 1976.

Iqbal, Farrukh. Rural Savings, Investment and Interest Rates in Developing Countries: Evidence from India. Rand Corporation, 1982.

Khalily, M. A. Baqui, Richard L. Meyer and Leroy J. Hushak "Deposit Mobilization in Bangladesh: Implications for Rural Financial Institutions and Financial Policies." The Bangladesh Development Studies. XV(1987).

Koropecky, O. Rural Saving Potential in Bangladesh. Draft Report. Robert Nathan Associates, Inc., 1984.

Lanyi, A. and R. Saracoglu. "Interest Rate Policies in Developing Countries." Occasional Staff Paper No. 22. Washington, D.C.:International Monetary Fund, 1983.

Mauri, A. "The Potential for Savings and Financial Innovation in Africa." Savings and Development. 7(1983):319-336.

Meyer, R. L. "Deposit Mobilization for Rural Lending." Report of the Third Technical Consultation on the Scheme for Agricultural Credit Development. Rome: FAO, 1986.

---------- and E. Esguerra. "Rural Deposit Mobilization Experiences and Issues in Selected Asian Cpountries." Mobilization of Rural Savings in Selected Countries in Asia and Pacific. Bangkok: APRACA, Monograph No. 15, 1985.

McKinnon, R. I. Money and Capital in Economic Development. Washington, D.C.: Brookings Institute, 1973.

Ortmeyer, D. L. "A Portfolio Model of Korean Household Savings Behavior, 1962-76." Economic Development and Cultural Change. 33(1985):575-599.

Patrick, H. "Financial Development and Economic Growth in Underdeveloped Countries." Economic Development and Cultural Change. 14(1966):174-189.

Rana, P. B. Domestic Resource Mobilization through Financial Development: Bangladesh. Manila: Asian Development Bank, March, 1984.

Shaw, Edward. Financial Deepening in Economic Development. New York: Oxford University Press, 1973.

Spong, K. and T. Hoenig. "An Examination of Individual Bank Growth: An Empirical Analysis." Journal of Bank Research. Winter(1977):303-310.

Srinivasan, A. and R. L. Meyer. "Costs of Intermediation in Rural Banking in Bangladesh." ESO No. 1463, Department of Agricultural Economics and Rural Sociology, The Ohio State University, 1988.

Srinivasan, A. and R. L. Meyer. "An Empirical Analysis of Rural Deposit Mobilization in South Asia." ESO No. 1249, Department of Agricultural Economics and Rural Sociology, The Ohio State University, 1986.

Tanchoco-Subido, Chito. "Rural Savings Behavior." School of Economics, University of the Philippines (mimeo), 1981.

Vasquez, A. L. Determinants of Household Deposit Behavior in the Dominican Republic. Unpublished M.S. Thesis. The Ohio State University, 1986.

Vogel, R. C. "The Potential for Rural Savings Mobilization: Some Evidence from Latin America." Syracuse University, New York (mimeo), 1980.

Von Pischke, J. D. "Towards an Operational Approach to Savings for Rural Development." Savings and Development. 2(1978):43-57.

Wai, U. Tun. Financial Intermediaries and National Savings in Developing Countries. New York: Praeger, 1972.

Williamson, J. G. "Personal Savings in Developing Nations: An Inter-temporal Cross-Section from Asia." Economic Record. 44(1968):194-210.

World Bank. Bangladesh Agricultural Credit Review - A Joint Review by Government of Bangladesh and World Bank. Volume I, II, III, August, 1983.